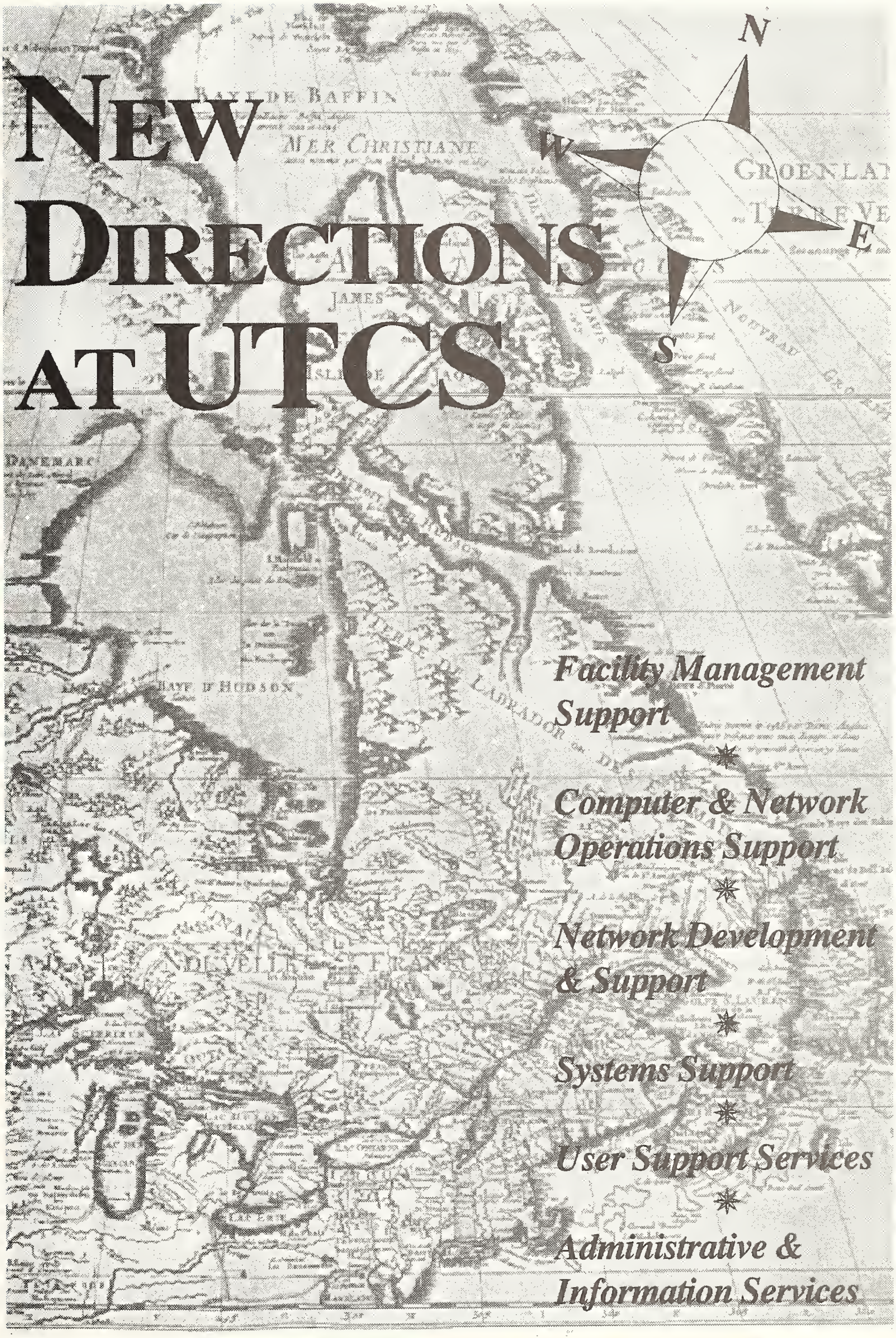
UTCS ComputerNews

university of toronto
computing services



NEW DIRECTIONS AT UTCS

Facility Management Support

✳

Computer & Network Operations Support

✳

Network Development & Support

✳

Systems Support

✳

User Support Services

✳

Administrative & Information Services

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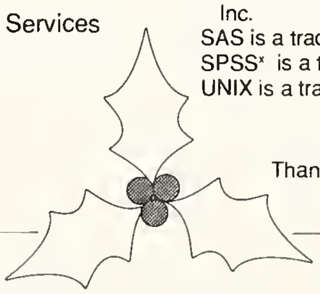

Best wishes for a safe and happy holiday season
from all of us at UTCS.

This newsletter was entirely produced on a Macintosh using PageMaker and other related Macintosh software.

New Directions at UTCS

To help you become familiar with the new directions at UTCS, we've prepared this short guide describing what we do. Most of the managers have written a general overview of their sections, while the supervisors have provided detailed descriptions of the services their groups offer. The topics covered in each description include:

- what the group does,
- which communities the group serves,
- how to obtain the services of the group, and
- projects the group will focus on in the next few months.

The names and phone numbers of contact persons have been included wherever they are appropriate. The articles follow the order of the organization chart given below, moving from left to right.

Major revisions have been made in the "back pages" of *ComputerNews*. The Directory listings have been revised to reflect the new groupings and functions of UTCS. The Microcomputer and Mainframe Software listings have been substantially reduced. The Site Licences section has been redesigned to accommodate three new licences. We hope these changes, along with the information in the "New Directions" guide, will help you to learn about our new focus groups and to become reacquainted with the old.

Patricia Hood, Editor

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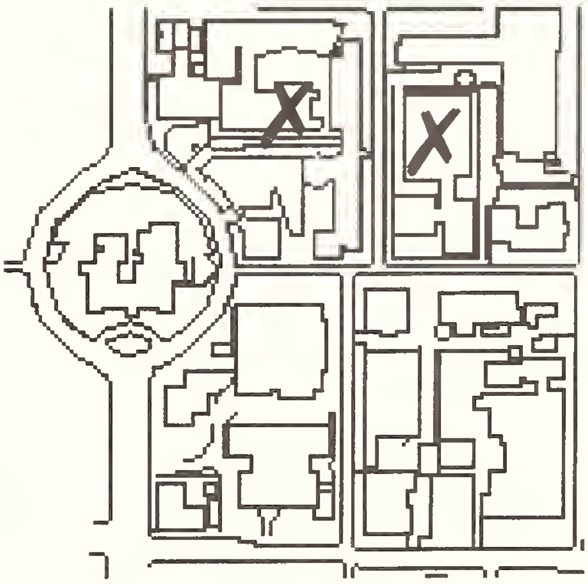
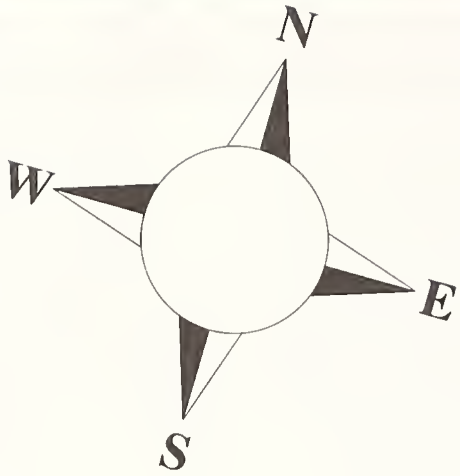
ComputerNews Publishing Schedule

With this issue, *ComputerNews* resumes its traditional publishing schedule. The issues planned for 1992, along with their publication dates, are listed below:

January/February 1992	#275	February 1, 1992
March 1992	#276	March 1, 1992
April 1992	#277	April 1, 1992
May/June 1992	#278	June 1, 1992
July/August 1992	#279	August 1, 1992
September 1992	#280	September 1, 1992
October 1992	#281	October 1, 1992
November/December 1992	#282	December 1, 1992





Facility Management Support

Vera Cabanus
vcabanus@gpu.utcs.utoronto.ca

Overview of the Facility Management Group

This newly-created group, reporting to Vera Cabanus, consists of two self-funding sections: Internal Facility Management and Micro Sales & Maintenance. We have been providing the University of Toronto with facility management services for undergraduate computing for a number of years now, and will soon expand this service to departmental local office systems as well. With the proliferation of microcomputers, workstations, and small office systems, many departments are seeking to establish their own networked systems. Sooner or later, they request a connection to the U of T General Purpose Backbone (GPB). Once their needs have been identified and they accept the recommendations put forward by other UTCS groups, staff members from the Facility Management Support group can be contracted to install the hardware (including security devices), network software, and application packages. Some institutional hardware purchases might be economically arranged through Micro Sales & Maintenance (see the detailed description later in this article). Should a department lack the appropriate personnel for ongoing support of their facility, operational support (including operating and application software upgrades) can be arranged via a facility management agreement. Once the hardware warranty expires, arrangements can be made for maintenance through Micro Sales & Maintenance. Any department interested in facility management for their undergraduate labs or office systems, or in help installing their new hardware and software, should contact Vera Cabanus at 978-7107 or via electronic mail (e-mail) at *vcabanus@gpu.utcs.utoronto.ca*. Departments wishing to make arrangements for maintenance of their microcomputers should contact Kam Mark, Micro Sales & Maintenance Supervisor, at 978-5050 or via e-mail at *kam@gpu.utcs.utoronto.ca*.

At the present time, the following Facility Management staff members report to the Supervisor, Facility Management (TBA): Joe Lim, Supervisor at the Erindale College Computing Facility; Ferucio Ciobanu, CQUEST Site Co-ordinator; Dan Lemmon, CDF/PC Site Coordinator; and Howard Lem.

Support at Erindale College

At Erindale College, UTCS provides facility management services for a SUN 3/280 undergraduate computing site and PC and Macintosh labs. A laser printing facility is provided for Erindale students on a cost-recovery basis. Students can sign out manuals and trade magazines that we provide. Account generation, software support, and advising for students using the hardware mentioned above is provided by Gordon Cook, who reports to Joe Lim. The undergraduate facility is open seven days per week, 24 hours a day, with advising hours as follows:

Advising Hours at the Erindale Undergraduate Facility

Monday - Thursday
9:00 a.m. - 8:00 p.m.

Friday
9:00 a.m.- 5:00 p.m.

Saturday
12:00 p.m.- 6:00 p.m.

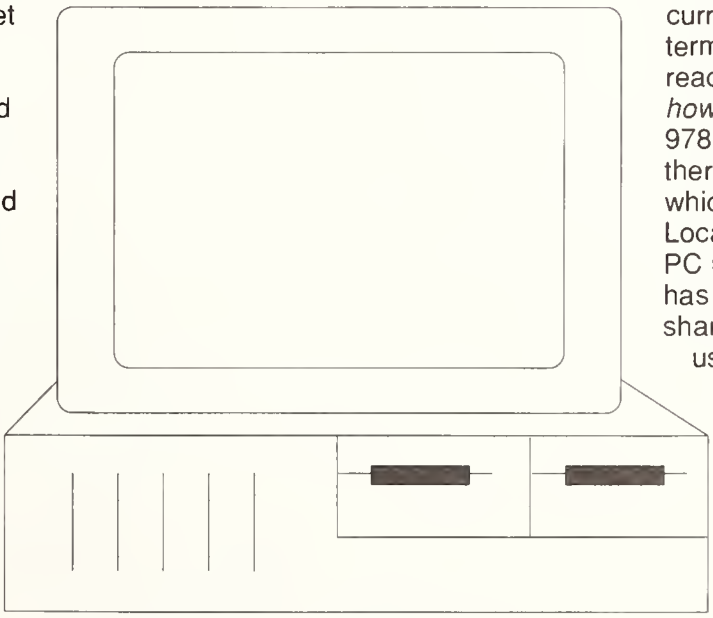
Sunday
12:00 p.m. - 6:00 p.m.

NOTE: These hours are available only during the winter session (September - April), except during exams.

Researchers are serviced by the same SUN 3/280 and by a VAX 8200 running VMS. The research facility also has an OMR scanner for multiple choice exams, a laser printer, a plotter, and an image scanner. The research facility operates on a cost-recovery basis.

Erindale's computing facility is connected to the St. George Ethernet backbone via a 56 kilobaud (Kb) telephone line. A Gandalf StarMaster serves as a front-end to all terminals/PCs at Erindale. This gives users the ability to choose any of the services available, not just at Erindale, but also at the St. George campus. The StarMaster is connected by yet another 56Kb line to UTCS' PACXNET network. The Erindale Library has benefitted from this as they are able to offer their FELiX online cataloguing system to students and faculty.

In addition to the sites we manage at Erindale, UTCS provides the Erindale Library with support for its PC network (Novell), application software (WordPerfect 5.0, Microsoft Word, QUATTRO PRO), generation of user accounts, low-level user documentation, and student advising. Joe Lim also administers and distributes PC Software Licences for Erindale College and is the primary contact for Erindale's departments and individuals seeking connection to Erindale's backbone. For other services provided by UTCS staff at Erindale College, please contact Joe Lim at 828-5311, or via e-mail at *joe@credit.erin.utoronto.ca.*



Support at the St. George Campus

Undergraduate Labs

On the St. George campus, UTCS has a facility management agreement with the Department of Computer Science to run and manage their undergraduate PC labs. There are four Local Area Networks (LANs) consisting of 88 NEC microcomputers (with colour monitors) running MS-DOS and Turing. All 88 PCs are equipped with 3.5-inch floppy drives and do not have hard disks. Three of the LANs are serviced by a fileserver. This fileserver is connected to a UTCS-operated nodal processor, which is attached to the U of T General Purpose Backbone. Only Trinity College's fileserver, which supports three NEC microcomputers, is not connected to the GPB. There are 36 NEC PCs which have shared access to a line printer at the Robarts Library. The AT-style PC with two different size floppy disk drives allows students to copy files between 5.25-inch and 3.25-inch diskettes. The Sidney Smith building houses 23 NEC PCs that are serviced by a dedicated line printer. St. Michael's College has a complement of 26 NEC PCs that share a line printer. Again, each fileserver is attached to a nodal processor which is connected to U of T's GPB. For the fall semester, 2,139 student accounts in four different first-year courses were set up on each fileserver. In addition, 153 student accounts for second-year courses were set up on the St. Michael's fileserver. The above-mentioned equipment is used primarily for introductory computer science courses. Dan Lemmon, who is the CDF/PC Site Co-ordinator, is responsible for the smooth and efficient operation of these sites, and can be reached at 978-2043 or via e-mail at *dan@gpu.utcs.utoronto.ca.* Dan Lemmon and Howard Lem are also responsible for the operation of UTCS public sites that are currently equipped with XT100 terminals. Howard can be reached at *howard@gpu.utcs.utoronto.ca* or 978-4310. At Robarts Library there are 24 XT100 terminals which are connected to PACX. Local printing is shared with CDF/PC users. St. Michael's College has nine PACX terminals that share a printer with CDF/PC users. Trinity and Victoria College have a complement of two and three PACX terminals respectively; however, there is no local printing available at these sites.

CQUEST

Ferucio Ciobanu is the Site Co-ordinator in charge of the computing facilities for undergraduate teaching in the sciences in the Faculty of Arts and Science. The following departments are currently members of CQUEST (Computers in Quantitative and Empirical Science Teaching): Botany, Geography, Geology, Psychology, Statistics, and Zoology. The Ramsay Wright site consists of 10 DEC workstations with colour monitors, and 29 DEC X-window terminals connected in a local area network to the DEC 5000 system. The Sidney Smith site also has 10 DEC workstations with colour monitors, and 20 DEC X-window terminals connected in a local area network to the fileserver. Both DEC 5000 systems run a DEC version of UNIX (ULTRIX) and support the following software: C, SAS, S-Plus, Minitab, APL, GRASS, Soft-PC, GLIM, and FORTRAN. For people who need advanced formatting and typesetting, we have the TeX and LateX formatting packages. Each site is supported by three laser printers and three AT-style PCs with floppy disk drives for transferring files to and from the DOS system. Currently we have 3,253 student accounts in 13 different courses installed on each fileserver. Again, these fileservers are attached to UTCS nodal processors which are connected to the U of T's GPB. For operational questions, please contact Ferucio at 978-1502 or via e-mail at *fciobanu@gpu.utcs.utoronto.ca*. Operating system support is provided by Chris Siebenmann, who can be reached at 978-1255 or via e-mail at *cks@gpu.utcs.utoronto.ca*. Departments from the Faculty of Arts and Science who are not members of CQUEST, and would like to join or get some information, should contact Professor Carl Amrhein at 978-1592.

Micro Sales & Maintenance

The Micro Sales & Maintenance group is not a new group; it has been in business since 1985. Formerly part of Field Services, this group has been given a new name and the additional responsibility for institutional sales of microcomputers. Our expanded activities now include the following:

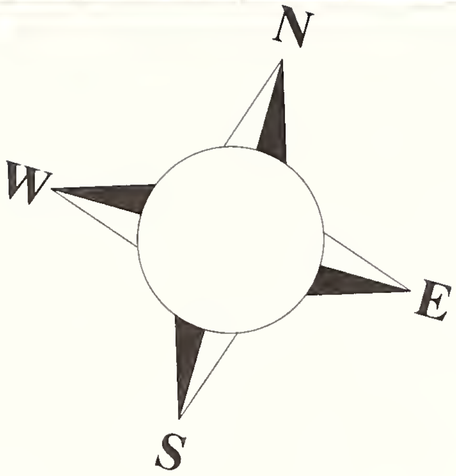
- diagnose and repair personal computers and peripherals (hardware and system software) for Apple computers, IBM PCs and clones, Zenith, Commodore, and others (we are an authorized repair centre for Apple and Zenith computer products);
- upgrade personal computers: CPUs, motherboards, memory, floppy and hard disk drives, other boards;
- initial setup of personal computers, install system software and applications packages, install networking software;
- investigate, recommend, and/or install security hardware for personal computers and peripherals;
- recover data from defective media;
- remove viruses from systems;
- purchase personal computers for departments on a "dealer cost plus handling" basis.

We offer maintenance contracts for personal computer systems and peripherals at competitive prices, on both an "on-site" and a "depot" basis. For a small annual fee, you won't have to worry about future large bills for the repair of your computer equipment. Call us for a free inspection and quotation for the maintenance of your personal computers. Your requests for a service call are handled through our central dispatch line at 978-1299.

Do you need institutional sales or to upgrade your personal computer? Give us a call. We may be able to do it for less money than you can yourself, and we guarantee our work so that there will be no hassles for you.

PC maintenance and repair services are available to any member of the University community — departments, faculty, staff, and students.

For information or service please contact Mr. Kam Mark at 978-5050, or via e-mail at *kam@gpu.utcs.utoronto.ca*.



Computer & Network Operations Support

For more information about the Computer & Network Operations Support group, contact Robert Chambers at 978-7092.

The Network Registrar

Herb Kugel
herb@vm.utcs.utoronto.ca

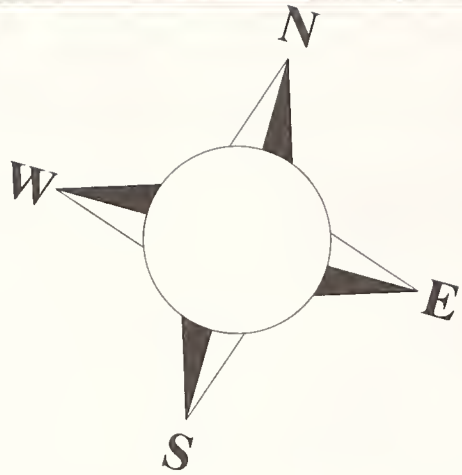
Networking is an integral part of the services supplied by UTCS. The network registration function supports the U of T role in both the NetNorth network and the Ontario Network (ONet).

For NetNorth, the Network Registrar maintains and updates the NetNorth nodes file, and sends these updated copies every month to the European Academic Research Network (EARN). There they are merged with nodes tables from all over the world. This updated master file is then used to drive the creation of the routing tables used for network communication by various systems all over the world. In addition to this, the Network Registrar interfaces with the Network Representatives from the various NetNorth member institutions, and helps to solve problems that may arise.

The Network Registrar is also extremely active in ONet. He is responsible for mailing ONet information to prospective new members, and then logging and tracking the events that lead to membership in ONet. These events include obtaining a TCP/IP number and a domain name; this involves interfacing with the Network Information Center (the NIC) in the USA and with the Canadian Domain Committee.

Additionally, the Network Registrar is responsible for issuing TCP/IP numbers to those institutions that do not wish to join ONet, and for helping potential new users either by answering questions or providing documentation.

If you would like additional information about the role of the Network Registrar at U of T, please send electronic mail to *herb@vm.utcs.utoronto.ca* or *herb@gpu.utcs.utoronto.ca.*



Network Development & Support

Norman Housley
norman@vm.utcs.utoronto.ca

The new Network Development and Support (NDS) group is involved in all data networking design and implementation at the University that falls within the purview of the Office of the Vice-President, Computing and Communications. It is new in that although it comprises some pieces of the previous group, Communications & Technical Support (CTS), there has been a significant restructuring and the addition of a new function, Network Services. Network Services is in the process of fully exploring its mandate. For the moment, however, it is busy defining the context and content of a suitable strategic institutional electronic mail environment. Over time, it will be specifying those tools and products that facilitate use of the campus network to obtain access to computing and information services, irrespective of whether these services are located on or off the campus.

Details of specific responsibilities of the three parts that make up NDS are indicated below in the very personal words of the supervisor of each group. The existing campus networking environment is currently being reexamined in light of new demands and technological opportunities. I would welcome any ideas that will make this evolution of the campus network truly a state-of-the-art transportation system for data. For more information, call Norman Housley, Network Development & Support Manager at 978-4967, or write to 4 Bancroft Avenue, Room 121B.

The Network Development Group

Primary Support Areas

The Network Development group is responsible for the development of general purpose networking infrastructure within the University of Toronto environments. Together with the other groups of Network Development and Support, we provide expertise for the design and implementation of university-wide networks as well as local area networks (LANs). We are also responsible for providing support to the Computer and Network Operations Support group for the day-to-day operation of networks managed by UTCS. Generally, the prime focus of the Network Development group is:

GPB Support The General Purpose Backbone (GPB) is a fibre-based Ethernet which, together with nodal processors, provides a packet switching system for data communications between buildings on the St. George campus. Additions to this environment are managed by Network Development.

Wide Area Links Suburban campuses and other distant sites are connected to the GPB environment with synchronous serial links. These links operate at a typical speed of 56 kilobits per second. Additions to this environment are managed by Network Development.

Internet Protocols The TCP/IP protocol suite is the primary protocol for data communications within the GPB and wide area environments. IP network addresses are assigned to LANs by Network Development.

DECNet Phase IV DECNet protocols are switched by some of our nodal processors and there is a University wide-area DECNet. The DECNet address space is managed by Network Development.

Secondary Support Areas

The Network Development group also supports several other areas as resources permit. Some of these areas are as follows:

DECNet<->Internet Gateway: We run software on a MicroVAX which supports electronic mail (e-mail), file transfer, and remote logon between DECNet hosts and IP hosts (e.g., UNIX).

RJE Network: This network supports Remote Job Entry (RJE) and printing services from remote sites to our mainframe systems.

Consulting: We can, when requirements are small, provide advice regarding networking solutions.

Information Services: We provide information to local network administrators in a variety of formats. We maintain contact information; we provide, when possible, network maps; and we maintain a public archive containing a variety of useful information collected from many sources. It is available via "anonymous FTP." In addition, several mailing lists are maintained to keep local network administrators informed about changes to the network or other matters of interest.

Network Statistics: Our nodal processors are monitored and statistics are generated daily showing the activity of the network.

Clients Internal to UTCS

The network development group supports the activities of many other groups within UTCS. It is the responsibility of these other groups to deal directly with most clients. For

Lee Oattes
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example, the Instructional Technology group or the Office Systems Support group might ask us for help with a project involving connectivity to the GPB, but we provide services to them in support of their clients rather than dealing directly with the client. Furthermore, our involvement in the day to day operational support of UTCS-managed networks is provided via the Computing and Network Operations Support group and/or the Facility Management Support group. Problems are reported to these groups and we are called, if needed, when the problem resolution requires additional support.

Clients External to UTCS

Although most of our contacts and support are directed toward internal UTCS groups, we do have some involvement with clients. In particular, we deal with local network administrators in providing IP subnet addresses, solving technical problems such as configuring an IP routing environment, and in offering some consulting services. We do, however, restrict contact to administrators, rather than the direct users, of the local area networks. This allows us to transfer knowledge and expertise more effectively.

Contacting the Network Development Group

If you have a local area network and are interested in a connection to the GPB, then you should send a letter stating this to Norman Housley, Manager, Network Development and Support. If you wish to discuss technical aspects of such a connection, please feel free to call Lee Oattes at 978-5448. You should be aware that GPB connections are not inexpensive, and that they can take a long time to accomplish.

If you would like to acquire an IP subnet number, you may contact any member of the Network Development group by calling 978-3787. Alternately, you may send electronic mail to *net-eng@utcs.utoronto.ca.* Your LAN does not need to be connected to the GPB for you to request an IP subnet number. We recommend that you have one even if you are not connected, since this will avoid the need to reconfigure your environment should you eventually acquire a GPB connection. Of course, if you never intend to be connected, there is no need to request an official U of T subnet number.

You should report all day-to-day operational problems to the UTCS Network Operations Centre. Call 978-4621 or send e-mail to *noc@utcs.utoronto.ca*. If you would like to discuss highly technical issues related to the operation of the GPB, then you may wish to contact a member of Network Development. Call 978-3787 or send e-mail to *net-eng@utcs.utoronto.ca*.

Local network administrators who have quick questions regarding networking technology, with regard to IP protocols or basic Ethernet equipment in particular, should call the Network Development group at 978-3787. We are happy to provide advice on a variety of subjects, provided that the questions are ones which we can answer directly over the phone. Queries, problems, or proposals which require significant amounts of effort need to be incorporated within our annual work projects. Requests of this nature should be made to Norman Housley (see previous contact information).

Information Services

There are many useful documents available via our anonymous FTP archive on *gw.utoronto.ca*. For instance, we have the Internet RFC documents on line, the working documents of the Internet Engineering Task Force (this organization is responsible, in the large part, for the development of the Internet Standards), and several introductory documents which help new network administrators get started. To make use of the archive you must have a network connection, ftp to host *gw.utoronto.ca*, log in as user "anonymous", and provide a password identifying yourself (it is common to provide an e-mail address). You will then be given access to the archive directory on *gw.utoronto.ca* which contains documents which may be transferred to your host via the FTP "get" command. As all documents are compressed, you must use the binary transfer mode, and, of course, you must have the "uncompress" command on your host to unpack the files.

For more information about the Network Development group, call Lee Oattes at 978-5448.

Network Implementation Group

The Network Implementation group offers a variety of services that pertain to the base level communications available to the general University community. In particular, we engineer, seek quotes for, and assist in choosing a contractor to do the cabling for your local area network. We supervise such jobs, as well as recommend and install network hubs and media access units. In addition to this, one of our responsibilities is implementing and servicing more mature communication technologies, such as point to point and switched low speed access. This group supports the two software products that are used for communications with the Administrative System and the VM service, NCP and VTAM.

The campus data communications infrastructure is installed and maintained by us. This function includes splicing the optical fibre which is used as the medium for all backbone technologies. The Network Implementation group provides comprehensive support for the Token Ring and Terminal Switched Backbone networks. We expect to expand the campus infrastructure in the near future as part of an anti-recessionary programme.

A recent addition to our duties includes satellite reception, video conferencing, and distance learning. The latter is expected to consume a good deal of our resources in the coming months as we attempt to implement a pilot project. Anyone interested in the satellite/video initiatives should contact our Communications Systems Specialist, Krishna Patnaik, at 978-3997.

General enquiries regarding any of the above should be directed to Tom Currie at 978-4624.

Tom Currie
currie@vm.utcs.utoronto.ca

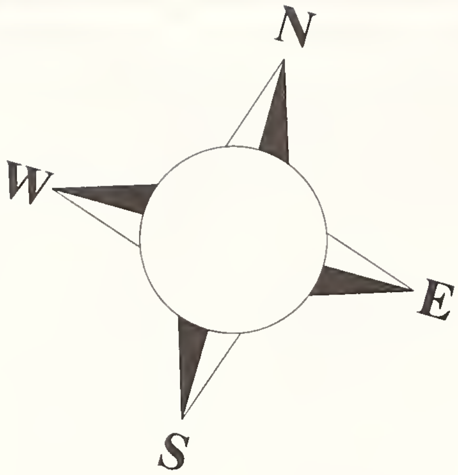
Network Services

As the campus network connects an ever-broadening array of people, the need for network access to information becomes increasingly apparent. The Network Services group was created to examine network-oriented products, with the goal of simplifying the sharing of information amongst work groups.

While the full range of relevant services is presently unclear, the area of electronic mail is quite evident. It is the intention of the group to determine the most effective way to provide, to the University, mail services that allow all to participate, regardless of the preferred computing environment. The electronic-mail solution must be able to grow as the network does, and be flexible enough to allow work group applications to be delivered as they become available. It is recognized that the University is part of a global information-sharing community, and that the requirements for external connections are as varied as the groups using them.

If you have any thoughts on networking services in general, or electronic mail in particular, please call Barry Lay at 978-6509, or send electronic mail to *barry@gpu.utcs.utoronto.ca.*

Barry Lay
barry@gpu.utcs.utoronto.ca



Systems Support

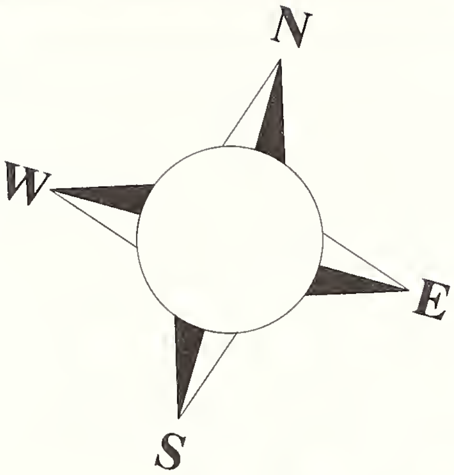
The Systems Support group provides system development, management, and operating system support for UTCS-managed computers.

On the IBM platform, the group installs and maintains the operating system and subsystems on the Administrative and Computing Services mainframes, and administers and manages the NetNorth gateway.

On the UNIX platform, the Systems Support group installs and maintains operating systems on several distributed minicomputers and workstations. It also develops, maintains, and administers network resources.

This is essentially an internal UTCS support function.

For more information, contact Bill Lauriston at 978-3579.



User Support Services

Don Gibson
don@vm.utcs.utoronto.ca

The User Support Services (USS) group provides services in two general ways. We provide general advisory assistance, and we support projects which advance the use of information technology within the University. The Advising and Consulting group provides general advisory assistance for a range of products (see following article). USS also maintains a microcomputer lab that houses various pieces of computer equipment and software; you can use these free of charge to assist in the selection of computer products. The lab also has a modest collection of electronic-based information sources, such as CD-ROMs.

The major focus of USS is support of specific activities that are of major importance to the University. To this end, two new groups have been created. The Instructional Technology group focusses on instructional initiatives; the Office Systems Support group focusses on local office systems. The role of both of these groups is discussed in the following pages. The underlying technical support for these activities is provided by the Information Technology Support group and by other areas of speciality within the division of Computing and Communications.

Advising and Consulting

Martha Parrott
parrott@utcs.utoronto.ca

The aim of Phone-in Advising is to answer quick questions immediately, offer a call back or an appointment for more difficult questions, or, if appropriate, redirect your call to another UTCS group.

The Advising and Consulting group is available to University faculty, staff, and graduate students. We offer two levels of support: Phone-in Advising and consultations by appointment.

Phone-in Advising is available from 978-HELP (4357) Monday through Friday between noon and 6:00 p.m. The HELP line is answered by student advisors trained by UTCS to deal with queries about the products we support. At the minimum, these advisors will be expected to handle queries on any of the product features covered in UTCS' introductory short courses—a significant increase in the depth of service offered at this level in the past. The aim of Phone-in Advising is to answer quick questions immediately, offer a call back or an appointment for more difficult questions, or, if appropriate, redirect your call to another UTCS group. It is important for us to limit the initial telephone time for each caller to a maximum of five minutes, since calls will be taken in sequence, and we would like to minimize the amount of time you spend waiting in the queue.

Consulting is offered by appointment only. UTCS consultants are full-time staff members with experience in all of the products we support. In addition to a general knowledge of our range of products, each of the four consultants specializes in at least one of four areas of application software: word processing, databases, spreadsheets, and statistical packages. Appointments are limited to a maximum of one hour and are available on a first come, first served basis as time allows. We will do our best to help you in a reasonable time, using all the resources available to us within UTCS and from vendor technical support.

What exactly do we support?

Below is a list of products supported by Advising and Consulting. As a result of the reorganization, we are now forced to support a smaller number of products. However, our statistics suggest we will still be able to deal with at least 70% of the queries that have customarily come to us. In other words, a great majority of our constituency is using a core group of products that we do support.

IBM Platform	**Macintosh Platform**
DOS	System & Finder
WordPerfect	Microsoft Word
dBASE IV	FoxBASE
Lotus 1-2-3	Microsoft Excel
ProComm	MacKermit
	QuickMail

Use of SAS , SPSSx, and SYSTAT will be supported primarily by the statistics consultant; other consultants will have some knowledge of SAS.

Statistics Products Supported by Advising & Consulting

Sandra Gardner
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As the Statistics Consultant within Advising and Consulting, I primarily support the use of SAS, SPSS, and SYSTAT. This includes phone-in help, consulting by appointment, and teaching short courses. At present, I teach SAS PC courses only, but we are surveying our SPSS/PC+ users to determine whether a course is needed for that product as well.

SAS, SPSS, and SYSTAT are comprehensive statistical software products. All have the ability to function interactively, as well as run batch programs. Each supports a wide variety of data analysis techniques and is able to manipulate data before and after analysis. SAS, in particular, can be considered a programming language and may be useful for non-statistical computing applications.

Table 1 (next page) describes the different versions of these products that I currently support. The computing platforms include CMS, DOS, Macintosh, and some UNIX-based computers. (CMS is UTCS' mainframe platform and is the platform of choice if you are processing tape jobs.) I will support the use of other versions of SAS and SPSS currently licensed by other University of Toronto departments, for example, the EPAS and CQUEST sites.

Although not supported by Advising and Consulting, other software available through UTCS, such as BMDP, IMSL, Maple, and NAg, may also be useful for statistical programming and data analysis. Table 2 describes which versions of these products are available through UTCS.

BMDP is another comprehensive statistical software product available on CMS. It operates independently but may also be activated within SAS on CMS by running PROC BMDP. This allows SAS users to run some specialized BMDP procedures. (The SAS program has to execute with the SASBMDP EXEC.) BMDP users should expect to work independently, since I provide very little support for the use of BMDP.

IMSL and NAg are FORTRAN libraries which contain some statistical routines. Maple is a computer algebra system which includes the ability to manipulate matrices. Experienced programmers could develop their own statistical procedures using these products. For more information or questions about the use of IMSL, NAg, and Maple, please call Andrzej Pindor at 978-5045.

A few statistical software products, which were previously supported by UTCS, have a very limited user base and will no longer be supported. These products include BASS, MacSPIN, Minitab, NTSYS, PowerStat, STATPRO, and STATWORKS.

Table 2 Other Products

Product	Versions	Operating Systems
BMDP	1985, 1987	CMS
IMSL	9.2, 10.0	CMS, UNIX, DOS
Maple	4.3, V	CMS, UNIX, DOS, Macintosh
NAg	Mark 13, 14	CMS

How to Access Supported Products

Any product listed in Tables 1 or 2 as running under the DOS, Macintosh, or UNIX operating systems is available through a UTCS site licence. Please call the Information Desk at 978-4990 to obtain licensing details or to order manuals (where applicable). For information about SAS courses, please call the Education Coordinator at 978-4565.

To use CMS-based products, an active UTCS CMS account is required and familiarity with the CMS computing environment and XEDIT is an asset. Issue the CMS GETME command to access the product you wish to use (for example GETME SPSSX will obtain SPSSx version 3.1, and GETME SPSSX NEW will obtain SPSS version 4.1). Online help is available for most products.

* The new name for SPSSx is now SPSS. Version 4.1 is now available for CMS users. A description of the new features of SPSS and LISREL will appear in the next issue of *ComputerNews*.

Table 1 Major Statistics Products

Product	**Version**	**Modules**	**Operating System**
SAS PC	6.04	Base, STAT, GRAPH, FSP, ETS, IML	PC/MS DOS 2.0 or higher (stand alone or network installations)
SAS for Sun 3	6.03 & 6.07	Base, STAT, GRAPH, FSP, IML	SunOS 4.0 and 4.1, respectively
SAS for Sun 4	6.03 & 6.07	Base, STAT,GRAPH, FSP	SunOS 4.0 and 4.1, respectively
SAS	5.18	Base, STAT, GRAPH, FSP, ETS, OR	CMS
SAS (available early 1992)	6.07	Base, STAT, GRAPH, FSP, ETS, OR, CONNECT	CMS
SPSS/PC+	4.0	Base, Statistics, Advanced Statistics, Tables, Trends, Categories, Data Entry II, Graphics Interface	PC/MS DOS 2.0 or higher (stand alone or network installations)
SPSSx	3.1	Base, Advanced Statistics, Tables, LISREL V6.13	CMS
SPSS *	4.1	Base, Advanced Statistics, Tables, PRELIS, LISREL V7.16	CMS
SYSTAT	3.2	SYSTAT, SYGRAPH	Macintosh
SYSTAT	5.1	SYSTAT, SYGRAPH	Macintosh System 6.0.2 or higher (stand alone or network installations)

Your account will be charged for CPU time, tape mounts, disk storage, and so on. If you have questions about costs or you wish to open an account, please call the UTCS Accounting Office at 978-7148. Manuals for SAS under CMS may be purchased through the Information Desk at 978-4990. Other manuals are available through the University of Toronto Bookstore or from the software vendor.

I provide technical support for installing and using the statistics products described in Table 1. I will call the vendor's technical support group on your behalf if I cannot answer your question myself. Please telephone me at 978-5128 or send electronic mail to *sgardner@vm.utcs.utoronto.ca*.

Office Systems Support

Alex Nishri
nishri@gpu.utcs.utoronto.ca

The UTCS Office Systems Support group provides technical support for the analysis and implementation of office systems at the University. One facet of this support is providing software, hardware, and networking recommendations for improving office efficiency. Another facet of this support is coordinating the implementation of recommendations, including arranging the installation and ongoing maintenance and administration of computer and network environments, as well as training for the office staff.

A primary goal of the group is to provide consistent recommendations across campus. This means that we will be less interested in the latest "whiz bang" solutions, and more interested in stable ones that are accepted as industry standards. Consistency in equipment is useful for University offices that exchange or share information, and makes career moves within the University easier for staff. It is easier to hire staff with suitable skills from outside the University, since they may already be familiar with standard equipment. Finally, it ensures that investments in office environments will have lasting value. To develop these consistent environments, the group will be evaluating information technology solutions (software, hardware, and related equipment) and keeping in touch with offices in the commercial world.

In the next few months, we will be making recommendations to the many departments that were already in the queue before the reorganization of UTCS took place. We currently make recommendations for both Macintosh and PC platforms, and we will examine the Microsoft Windows and IBM OS/2 operating systems to determine which we will recommend for office environments where there is an established requirement for PC technology. (Before we make any recommendations, however, we will examine the overall impact and cost to the University of such a decision.) One issue that will affect our recommendation is which operating system (OS/2, Windows, or another) will become the next industry standard system for PCs. Technical issues also remain; for example, we need to evaluate and recommend a word processor and other standard office tools for such an environment.

Along with providing university offices with up-to-date office solutions, we will be evaluating some of the tools identified as requirements in several offices, such as group scheduling software. These projects are part of our ongoing effort to provide current and consistent office systems technology to the University community.

Information Technology Support Group

Terry Sanderson
sanders@gpu.utcs.utoronto.ca

The Information Technology Support (ITS) group provides advanced technical support in the areas of microcomputer hardware, operating systems, peripherals and their associated software, and local area networking to other groups within UTCS. To this end, the ITS group does not deal directly with end-users. However, the ITS group does operate the UTCS Microcomputer Lab, which provides the following end-user services:

- Product Evaluation Facility: Hardware and software in the microcomputer lab are available to the University community for testing purposes. By appointment, staff and faculty can reserve a workstation and evaluate a software package or use a particular piece of hardware.
- Phototypesetting Service: On an appointment basis, a Linotronic 100 phototypesetter is available for high-resolution output.
- CD-ROM Access: Computer Select, a CD-ROM containing more than 60,000 articles and abstracts from over 140 computer publications, is available by appointment. You can use Computer Select to locate product reviews, press releases, company information, and product specifications.

These facilities are located at 4 Bancroft Avenue, Room 201, and are available weekdays from 9:00 a.m. until 5:00 p.m. To make an appointment for any of the lab services, call George Katterloher at 978-5601.

Instructional Technology at UTCS

John Bradley
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Over the last year or so, many people have begun to recognize the possibilities inherent in the use of computers to contribute to teaching at the University of Toronto. In several departments, projects that take advantage of this new and exciting technology have been under way for well over a year. However, the division of Computing and Communications (UTCC) expects many other departments to become interested as well. Hence, as a result of the recent reorganization, UTCS has formed the Instructional Technology (InsT) group as the focus for a variety of services that can support any instructional-oriented project at the University of Toronto. The InsT group will either provide the services themselves, or assist in arranging them with other parts of UTCC. Among the services we can offer are:

Needs Analysis: The InsT group can work with you to clarify the technical needs of new projects. Clearly, the academic needs of your project are beyond the scope of this group, although the group can discuss or demonstrate relevant work done by others at the U of T or at other universities. This service is free to UTCC-approved projects.

Configuration and Recommendations*:* The InsT group can prepare a specific list of computer and local area network (LAN) software and hardware that you will need to launch your project. This service is free to UTCC-approved projects.

Equipment Acquisition: Where appropriate, the InsT group can handle the ordering of computer and LAN hardware and software for you. The handling of the order is free to UTCC-approved projects.

Software Site Licences: UTCS is able to provide favourable prices on some standard pieces of both computer and network software.

Project Management: The InsT group can coordinate the tasks associated with setting up the equipment: preparing the site, installing the equipment and software, and testing it. This is done by managing the various participants within and without UTCC, and tracking the implementation to ensure completion in as timely and efficient a manner as possible. This service is free to UTCC-approved projects.

Installation: The InsT group can, occasionally, install computer and network hardware and software. However, this task is normally performed by other parts of UTCS, and is normally charged for.

Staff Support: The InsT group can provide several different services to prepare your support staff. In particular, we can provide the necessary initial training and consultation for the software and hardware we support. From time to time we can provide additional consultation for problems. Training courses for some supported systems are offered by UTCS on a regular basis. Training is usually charged for at a nominal fee for University staff. A limited amount of consultation is available for free.

Faculty Empowerment: The InsT group can help your faculty and academic staff to become familiar with the new facility and to become efficient users of it. Examples of services could include demonstrations of the equipment or software, or the preparation of prototypes. Clearly, academic issues related to this empowerment remain outside our mandate. This service is free to UTCC-approved projects.

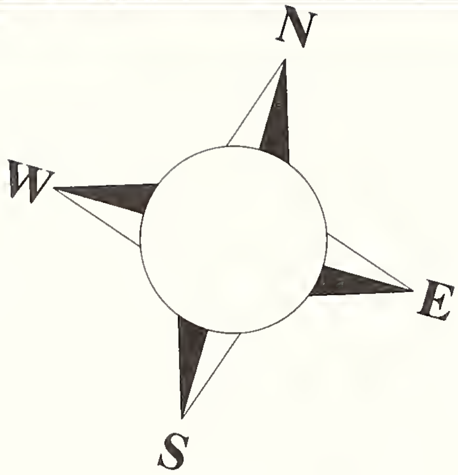
Facilities Management: The InsT group can coordinate participation by other UTCS staff to provide full implementation, or ongoing maintenance or support for your site. The actual facilities management task is normally arranged with other divisions of UTCS by contract, and is charged for.

Networking Support: The InsT group can advise and coordinate the provision of wide area networking to your installation, such as providing access to ONET or the university backbone network. This service will be offered in coordination with UTCS's Network Development and Support group. In many cases the provision of network services will be charged for.

Network Services: The InsT group can coordinate the participation of other UTCS staff in providing medium and large scale network services such as electronic mail or LISTSERV systems, or access to campus-wide information systems to your installation. Some of these services are normally charged for.

Technology Watch: From time to time, the InsT group is glad to introduce interested members of the university community to the direction and potential of instructional technology. We are excited by its potential, and are glad to share our knowledge with others. Limited consultation of this kind is free.

We hope many of you will be interested in investigating how computers can help with teaching in your department. If we can be of any assistance, please call John Bradley at 978-3995.



Administrative & Information Services

Ron Vander Kraats
rvk@vm.utcs.utoronto.ca

The Administrative and Information Services (AIS) group, located at 4 Bancroft Avenue, provides a number of services for both UTCS itself and the University community at large.

*AIS is organized into four sub-groups. Marg Doherty supervises the Budget and Results group, which is responsible for the UTCS annual budget as well as accounts payable and accounts receivable matters. This group also provides accounting services for the University's telephone system on behalf of the Voice Communications Department, and for external networking under contract to ONet and CA*net. Adriana Koufis is in charge of the Staff Support group. This group handles the personnel function within UTCS and provides administrative and secretarial services. The Information Services group, headed by Pat Hood, has joined AIS as a result of the UTCS reorganization. This group produces* ComputerNews*, the UTCS newsletter, as well as the new UTCC newsletter (watch for the first issue in December). This group also coordinates and provides instructors for UTCS short courses. Last year, over 70 courses were offered to nearly 600 members of the University community. Information Services administers the UTCS Software Licensing Program. Last year, more than one thousand software site licences were sold to over 110 departments, saving the University $425,000. Our fourth group, Programming Support, reports directly to me, and is responsible for developing and maintaining UTCS business systems.*

For general enquiries about the AIS group, call 978-4462.

Budget and Results

Marg Doherty
marg@utcs.utoronto.ca

The UTCS Accounting Office, located at 4 Bancroft Avenue, Room 100B, sets up customer accounts and logon IDs for the two mainframe services (GP-UNIX and VM/CMS), and bills customers for all UTCS services.

This office also provides accounting services to the Voice Communications Department for the processing of payments to carriers for voice and data services and chargeback to University departments.

Some of the more recent functions taken on by UTCS accounting are in support of the two networks, CA*net and ONet, currently being administered by the University of Toronto Computing Services. These functions include tracking expenses and income, the billing of membership fees, and financial reporting.

The recent reorganization has not resulted in staff changes for this office, but the change in workload balance over the last year does reflect the new service direction of UTCS.

Key customer contacts at the accounting office are:

Jason Pante, Customer Accounts	978-8697
JoAnne Barteski, Voice and Data Billing	978-4463

Staff Support

Adriana Koufis
koufis@vm.utcs.utoronto.ca

Staff Support is an umbrella term used to describe the eclectic nature of our group's responsibilities. That is to say, while our supportive role at UTCS has an administrative emphasis, we also initiate and co-ordinate various "special" projects.

Included in the administrative function, under the broad heading Human Resources, are the tasks of staffing, compensation management, and organizational relations. We also provide internal secretarial and clerical support in addition to mail and office supply distribution services. As well, it is our responsibility to monitor and maintain the department's computer hardware inventory.

With respect to "special" projects, our most recent project has been the introduction of an office recycling program with the incumbent blue boxes and awareness programs. A second, longer term project has been the organization and operation of fundraising events for the United Way – this year's Bake/Garage Sale was the best ever! And last but not least, we organize the ever-challenging internal social events including the "Company Picnic" and "Christmas Party" – to keep the troops happy!!

Information Services

Patricia Hood
phood@vm.utcs.utoronto.ca

Information Services focusses on providing computing-specific information to the U of T community in a number of different ways. Through the Education Office, we administer, design, and teach short courses in microcomputer software. In the Information Office, we license and/or sell microcomputer software and software documentation. This office also redirects general queries to the most suitable person or group within UTCS. *ComputerNews*, the department newsletter, is one of the printed sources of information that we produce. It contains reviews, announcements, and "how-to" articles to assist you in making the most effective use of your computing resources. Information Services also assists in producing the *Computing & Communications Newsletter*, the first issue of which will be available in December 1991.

Information Services serves all departments, faculty, staff, and graduate students at U of T. A limited number of site licences are available to undergraduate students as well. If you don't know who to talk to about a specific computing problem, call the Information Office at 978-4990. Also call the Information Office to find out about purchasing one of our many software site licences or manuals. To register for a microcomputer course, contact the Education Coordinator at 978-4565. To subscribe to *ComputerNews* or the *Computing & Communications Newsletter*, contact the Editorial Assistant at 978-4034. The locations to which you can send your inquiries follow.

Address course inquiries and completed registration forms to:

UTCS Education Coordinator
4 Bancroft Avenue, Room 217
Toronto, ON M5S 1C1

Address Information Office inquiries to:

UTCS Information Office
4 Bancroft Avenue, Room 201
Toronto, ON M5S 1C1

Address *ComputerNews* inquiries to:

ComputerNews
UTCS
4 Bancroft Avenue, Room 201
Toronto, ON M5S 1C1

In the next few months, Information Services will be updating existing publications to reflect the results of the reorganization of UTCS. While we will be busy publishing two newsletters, we also expect to produce a comprehensive guide to UTCS services. Some short courses will be revised to reflect updates in the software, and new course offerings will be investigated.

UTCS Noncredit Microcomputer Courses
1992 New Year Schedule

Irene Rosiecki
rosiecki@vm.utcs.utoronto.ca

UTCS is offering various noncredit microcomputer courses in the new year. These courses are available to faculty, staff, and graduate students of the University of Toronto, and cover a number of software programs available for the PC or the Macintosh. Whether you will be typing a thesis on a word processor, or working with spreadsheets or databases, we may be able to help you get started.

The table below lists all the microcomputer courses scheduled from January through to April 1992.

	Jan.	Feb.	Mar.	Apr.
Database				
Introduction to dBASE IV	✓		✓	
Introduction to FoxBASE+/2.0	✓		✓	
Hypermedia				
HyperCard Seminar		✓		
Operating System				
Introduction to DOS			✓	
Spreadsheet				
Introduction to Excel		✓		✓
Introduction to Lotus 1-2-3		✓	✓	
Statistics				
Introduction to SAS		✓		✓
Intermediate SAS-Data Processing	✓			
Intermediate SAS-Statistics			✓	
Word Processing				
Introduction to Microsoft Word on the Mac	✓		✓	
Introduction to WordPerfect 5.1	✓	✓	✓	✓
Advanced WordPerfect 5.1 Topics	✓		✓	
Communications				
Electronic Mail Seminar		✓		✓
ProComm Communications Seminar				✓

Our class sizes are small, allowing for much individual attention. To find out about exact course dates and times, registration procedures, or to book a place in any of these courses, please contact Irene Rosiecki at 978-4565. Courses are filled on a first-come, first-served basis. The more popular courses fill up quickly, but waiting lists are maintained in case of cancellations.

Computing Communications

News from UTCC

Protecting Your PC or Mac Against Computer Viruses

Computer viruses have been around for several years, but it is only in the last couple of years that they have been making headlines. Viral infections of microcomputers are on the increase in the Toronto area. This is because viruses can be modified to create new versions and new viruses are being created all the time. It is also due to the increased use of microcomputers in the business and home environments.

At best, a virus can be an annoyance to the user of an infected machine. Often, however, the virus ends up costing the user time and money. Some viruses alter or destroy directories and file allocation tables, which means the user may not be able to access or use the data stored on the infected hard drive or diskettes. Some viruses can also cause damage to equipment, such as the hard drive and the monitor.

How can you tell if your PC or Macintosh is infected? That depends on the type of virus. Some viruses let you know your microcomputer is infected by displaying a message on the screen. Others manifest themselves by playing a game on your computer (e.g., the Ping Pong virus). Others, notably "stealth" viruses, become active on a certain date (e.g., the Friday the 13th virus). Some viruses will slow down your computer's response time or prevent you from accessing files.

How can a microcomputer become infected? Most microcomputer environments are not controlled like a mainframe computer environment. Sharing of microcomputers and diskettes is common, and this contributes to the spread of viruses. There are several ways your PC or Macintosh can obtain a virus, including:

- use of infected diskettes (infected diskettes are the most common way viruses spread from one machine to another);
- use of infected shareware or software available on bulletin boards;
- use of pirated computer games.

What should you do if you suspect that a virus has infected your PC or Macintosh? Unless you know what you are doing, do not attempt to remove the virus. This may result in more damage than you started with. Instead, contact your Customer Service Representative or the UTCS Micro Sales & Maintenance group (978-1299) for assistance. Make sure that the infected microcomputer and any media used on it are isolated until the problem is solved.

What can you do to prevent your PC or Macintosh from becoming infected? Safe computing is relatively easy to achieve, and you can take some basic preventive measures. The following suggestions will help you practice safe computing.

1) Back up your files regularly (at least weekly). Make separate backups of your data files and your software, and store your backup in a safe and secure place away from your PC or Macintosh.
2) Do not use illegal or pirated software.
3) Do not use shareware unless you are absolutely sure that the programs are free of viruses.
4) If you download programs from bulletin boards, scan them for viruses before you use them.
5) If you bring any diskettes from home, scan them for viruses before using them, especially if your home computer is also used to play computer games.
6) Do not install or play computer games. Games are commonly used as carriers of computer viruses.
7) When you get new software, make sure it is shrink-wrapped (i.e., wrapped tightly in plastic film). Make sure that your new software comes from a reliable supplier.
8) Make sure that your software diskettes are write-protected. This prevents viruses from being copied onto the diskettes.

9) If your "new" PC or Macintosh is really one that someone else used before you, ask the individual installing your microcomputer to do a low-level format of the hard drive. This will destroy any viruses on the hard drive, and will get rid of illegal copies of software.
10) If you are sharing diskettes with someone else, if you use your diskettes on someone else's computer, or if you use a computer that is part of a "pool", scan your diskettes before using them.
11) If you know or suspect that your microcomputer or any of your diskettes are infected, do not attempt to use your diskettes on another machine. Your diskettes are probably infected too, and all you will do is spread the virus and infect someone else's microcomputer.

Wilfred L. Camilleri
Security Administration, UTSD

C&C Newsletter Makes its Debut

Planning & Coordination is pleased to announce the premier issue of the *Computing & Communications Newsletter.* It will be distributed in early December.

Intended as a supplement to the University of Toronto Computing & Communications (UTCC) Annual Report, the newsletter will inform readers of UTCC projects in their earlier stages — as they are conceived and as they happen.

If you do not receive a copy and would like one, please write to Planning & Coordination, 215 Huron Street, 4th floor, Toronto, Ontario, M5S 1A1.

Eva Swenson
Planning & Coordination

Maple Software Available at U of T

Andrzej J. Pindor
apindor@vm.utcs.utoronto.ca

UTCS has acquired, at considerable expense, a site licence for Maple software for the University of Toronto. Developed at the University of Waterloo, Maple is a large symbolic manipulation package, with capabilities comparable to computer algebra systems (CAS) such as MACSYMA and Mathematica. (A brief description of Maple's capabilities follows the licensing information.)

Under the conditions of the licence, Maple can be installed on any computer owned and/or administered by the University of Toronto. The computer must be physically located on any of the University's three campuses or at the Institute for Aerospace Studies. Maple is available for most platforms, although not all implementations have yet been upgraded to the newest version, Maple V. If you wish to install Maple on your computer, you must fill out and sign a licence form (guaranteeing adherence to copyright rules) and pay a one-time fee. Following are sample fees for typical platforms. (They are calculated at 25% of the fees charged by Maple to individual users.) These fees are intended to help recoup the cost of the site licence to UTCS, since this purchase was not budgetted for in the current fiscal year.

In a network system, all machines that have unrestricted access to the server copy of Maple must be licensed. However, only the server copy is licensed at full price; up to nine other machines cost half price. For 1 - 20 machines on the network, two have to be licensed at full price, the others at half price; for 21 - 30 machines on the network, three machines are licensed at full price, the others at half price; and so on.

The licence entitles us to free upgrade support for one year. This means, for instance, that when Maple V becomes available for Apollo computers (at the moment only Maple 4.3 is available), Apollo users will be able to upgrade to Maple V at no cost. Very shortly (probably by the time you read this) Maple V will be available for Macintosh computers and for distribution by us.

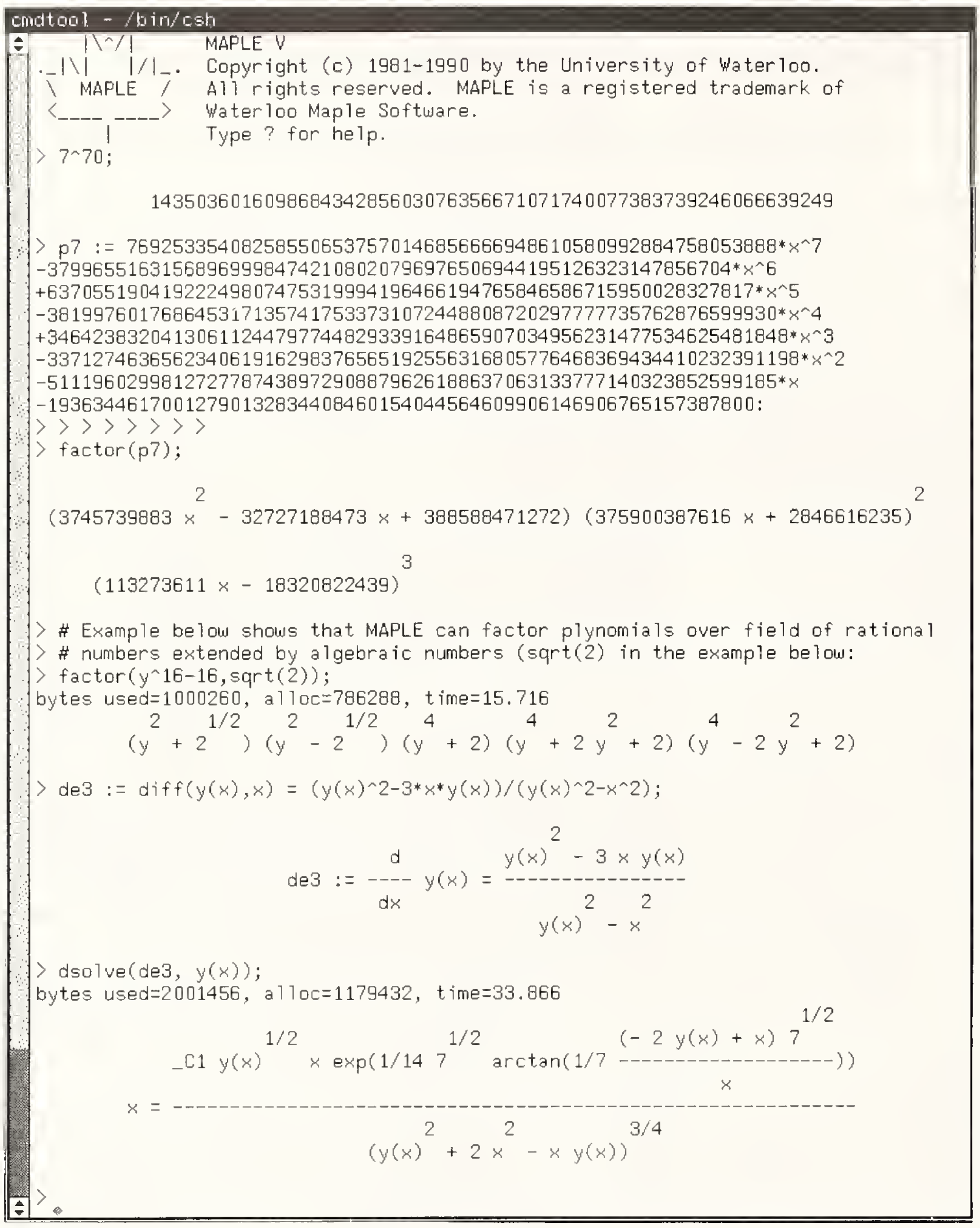
Software will be distributed by UTCS in the following way:

- For PCs, you will borrow a set of 3.5-inch or 5.25-inch high-density diskettes;
- For machines with FTP access, you will have to create a guest account on your machine where I will deposit two compressed tar files that contain the Maple software for your platform (one file contains platform-dependent executable, and the second platform-independent libraries and other things);
- All others can rent a 1/4-inch tape cartridge containing the required files.

Maple's Capabilities, in Brief

Maple manipulates and solves complex mathematical expressions symbolically, and does exact arithmetic.

	Machine	**Operating System**	**Cost**
1.	DECStation 2100, 3100	Ultrix	$300
2.	DECStation 5000, 5100	Ultrix	$500
3.	DECStation 5400, 5800	Ultrix	$760
4.	HP 9000/300, 9000/400	HP-UX 7.0	$300
5.	HP 9000/700, 9000/800	HP-UX 7.0	$430
6.	Sun3	Sun-OS 4.0	$240
7.	Sun4, SPARCStation	Sun-OS 4.0	$300
8.	SGI Personal IRIS	Irix	$300
9.	SGI Professional IRIS 50-80GT	Irix	$500
10.	SGI Professional IRIS 120-240GT	Irix	$760
11.	PC-386	DOS	$200
12.	MIPS RC3230	UNIX	$300
13.	IBM RS6000 model 320	AIX	$300
14.	Macintosh	Finder	$130



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    |\^/|      MAPLE V
._|\|   |/|_.  Copyright (c) 1981-1990 by the University of Waterloo.
 \  MAPLE  /   All rights reserved.  MAPLE is a registered trademark of
 <____ ____>   Waterloo Maple Software.
      |        Type ? for help.
> 7^70;

          143503601609868434285603076356671071740077383739246066639249

> p7 := 769253354082585506537570146856666948610580992884758053888*x^7
-3799655163156896999847421080207969765069441951263231478567O4*x^6
+6370551904192224980747531999419646619476584658671595002832781 7*x^5
-381997601768645317135741753373107244880872029777773576287659993O*x^4
+3464238320413061124479774482933916486590703495623147753462548184 8*x^3
-337127463656234061916298376565192556316805776468369434410232391198*x^2
-5111960299812727787438972908879626188637063133777140323852599185*x
-1936344617001279013283440846015404456460990614690676515738780 0:
> > > > > > > >
> factor(p7);

              2                                                              2
 (3745739883 x  - 32727188473 x + 388588471272) (375900387616 x + 2846616235)

                                3
     (113273611 x - 18320822439)

> # Example below shows that MAPLE can factor plynomials over field of rational
> # numbers extended by algebraic numbers (sqrt(2) in the example below:
> factor(y^16-16,sqrt(2));
bytes used=1000260, alloc=786288, time=15.716
          2    1/2    2    1/2    4        4      2        4      2
        (y  + 2   ) (y  - 2   ) (y  + 2) (y  + 2 y  + 2) (y  - 2 y  + 2)

> de3 := diff(y(x),x) = (y(x)^2-3*x*y(x))/(y(x)^2-x^2);

                                             2
                               d        y(x)  - 3 x y(x)
                      de3 := ---- y(x) = ----------------
                              dx                2    2
                                           y(x)  - x

> dsolve(de3, y(x));
bytes used=2001456, alloc=1179432, time=33.866
                                                                   1/2
                    1/2             1/2            (- 2 y(x) + x) 7
            _C1 y(x)    x exp(1/14 7    arctan(1/7 -------------------))
                                                            x
        x = ------------------------------------------------------------
                                  2      2         3/4
                             (y(x)  + 2 x  - x y(x))

>
```

Figure 1: An example of a Maple session.

The program allows you to deal with math in a natural, algebraic fashion, and also does numerical computations when necessary. The computations can be performed to any degree of precision.

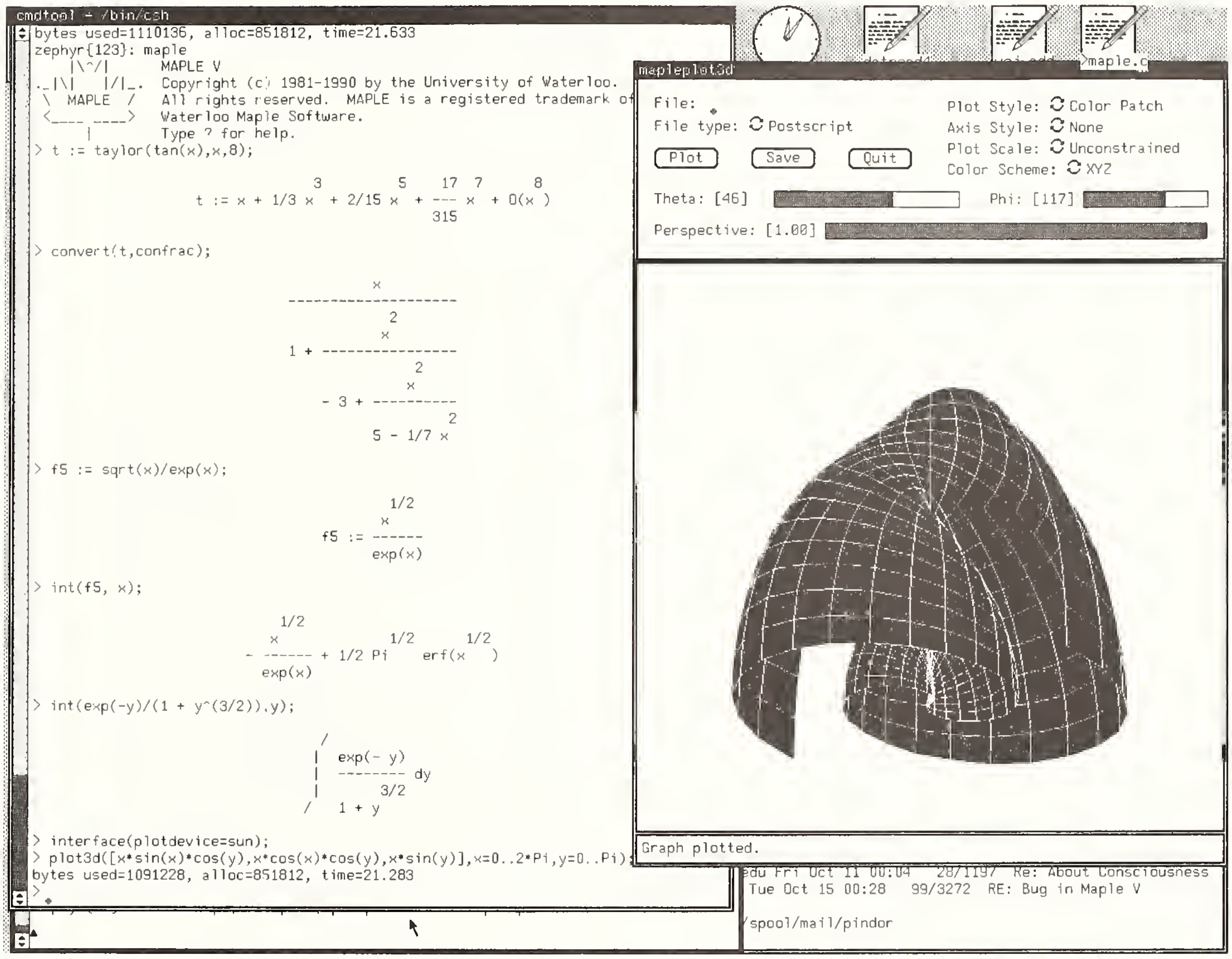
Maple capabilities include:

- General mathematics:
  - algebraic manipulations and simplifications, trigonometric and hyperbolic functions and inverses, special functions (Bessel, Beta, Gamma, Zeta), indefinite and definite integration, Laplace and inverse Laplace transforms, differential equations, limits, summation, logarithm, modular computation, series expansion, subexpression optimization, and so on;
- Combinatorics;
- Differential forms;
- Geometry and Projective Geometry;
- Groebner Bases;
- Group Theory;
- Linear Algebra:
  - matrix addition and multiplication, characteristic matrices and polynomials, determinant, eigenvectors and eigenvalues, Hermitian, Hessian and Hilbert matrices, Gaussian elimination, singular value decomposition, and so on;
- Linear optimization;
- Number Theory;
- Power Series;
- Statistics;
- Two- and three-dimensional (2D and 3D) plotting;
- Programming facilities.

Figure 1 shows you Maple in action. First you can see that Maple can handle very large numbers exactly. Then there are two examples of polynomial factorization. The second of these examples demonstrates that Maple can perform factorization over a field larger than the field of rational numbers. Finally, *Figure 1* also shows how Maple can solve differential equations.

On the left-hand side, *Figure 2* shows how Maple can convert a Taylor expansion into a continued fraction, and demonstrates symbolic integration. In the second example we see that if Maple cannot perform an integral, it returns the original function under a stylized integral sign. On the right-hand side of *Figure 2* we see an example of 3D graphics under SunView.

Both figures show Maple invoked with a generic TTY (teletype) interface. You can use this interface on any platform on which Maple will run. When you run Maple V under SunView or X windows, you may use a system-specific interface. These interfaces, which use a windowing environment, are much more user friendly. Maple on DOS machines and on Macintosh computers also has a system-specific interface.



```
bytes used=1110136, alloc=851812, time=21.633
zephyr{123}: maple
    |\^/|     MAPLE V
._|\|   |/|_. Copyright (c) 1981-1990 by the University of Waterloo.
 \  MAPLE  /  All rights reserved.  MAPLE is a registered trademark of
 <____ ____>  Waterloo Maple Software.
      |       Type ? for help.
> t := taylor(tan(x),x,8);

                                 3         5    17  7      8
                   t := x + 1/3 x  + 2/15 x  + --- x  + O(x )
                                               315

> convert(t,confrac);

                                        x
                              --------------------
                                          2
                                         x
                              1 + ----------------
                                             2
                                            x
                                  - 3 + ----------
                                                 2
                                        5 - 1/7 x

> f5 := sqrt(x)/exp(x);

                                          1/2
                                         x
                                  f5 := ------
                                        exp(x)

> int(f5, x);

                             1/2
                            x             1/2      1/2
                         - ------ + 1/2 Pi    erf(x    )
                           exp(x)

> int(exp(-y)/(1 + y^(3/2)),y);

                                  /
                                 |  exp(- y)
                                 |  -------- dy
                                 |       3/2
                                /   1 + y

> interface(plotdevice=sun);
> plot3d([x*sin(x)*cos(y),x*cos(x)*cos(y),x*sin(y)],x=0..2*Pi,y=0..Pi);
bytes used=1091228, alloc=851812, time=21.283
>
```

```
File:
File type: Postscript
Plot Style: Color Patch
Axis Style: None
Plot Scale: Unconstrained
Color Scheme: XYZ
Theta: [46]
Phi: [117]
Perspective: [1.00]
Graph plotted.
```

```
edu Fri Oct 11 00:04   28/1197  Re: About Consciousness
 Tue Oct 15 00:28   99/3272  RE: Bug in Maple V

/spool/mail/pindor
```

Figure 2: More Maple examples and 3D graphics under SunView.

Attention Users Who Will Run Maple V Under SunView!

The SunView interface is a very recent addition that is not yet documented, either in the manuals or in the online help. If you are using the TTY interface on a Sun computer and you want to plot a graph in a SunView window, you first must prepare Maple by typing the statement "interface(plotdevice=sun)". You can see this at the bottom of the left-hand window in *Figure 2*. (If you are using the SunView interface this is not necessary.) Note the various buttons in the plot window. You can use them to rotate the object, change the perspective, and change various aspects of the plot style.

There are three manuals for Maple. *Maple Language Reference Manual*, published by Springer Verlag, can be purchased from the U of T Bookstore for approximately $30. The second manual, *First Leaves: A Tutorial Introduction to Maple*, will be available for about $25 from Springer Verlag, probably early next year. At the moment it is available only from Waterloo Maple Software; you can order it through UTCS for $30 when you purchase your site licence. The third manual, *Maple Library Reference Manual*, which might be required only by heavy users of Maple, is also published by Springer Verlag and should be available from the U of T Bookstore for approximately $45.

For questions concerning the licence and the software itself, call Andrzej Pindor at 978-5045, or send electronic mail to *pindor@gpu.utcs*.

Statistical Software News

Sandra Gardner
sgardner@vm.utcs.utoronto.ca

SAS PC

UTCS has obtained two new integrated sets of SAS PC diskettes: 3.5-inch high-density and 5.25-inch high-density. The installation of SAS PC is now simpler and faster. No new software is available for existing users (with the exception of an upgrade in the Usage Notes). For more details about the SAS PC site licence, please call the Information Office at 978-4990.

Regular users of SAS PC might be interested in three articles written by SAS Institute's Technical Support Group:

1. "Configuring Your PC to Run the SAS System";
2. "21 Tips for Increasing Memory under the SAS System 6.03/6.04 for PC/MS-DOS";
3. "Running the SAS 6.04 System as a Non-Windows Application under Windows 3.0".

You may obtain copies of these articles through the Information Office.

SPSS

It is time to renew your SPSS/PC+ licence. The annual licence fee has been reduced to $40 for all modules including Data Entry II. If you wish to install Data Entry II as a standalone product, the annual license fee is $20. Reduced fees are available for SPSS installed on a network. Please call the Information Office at 978-4990 for further details.

SPSS version 4.1 is now available for CMS users. To access the new version, issue the GETME SPSSX NEW command. Look for an article describing the new features of SPSS, PRELIS, and LISREL in the next issue of *ComputerNews*.

Are you interested in an Introductory SPSS/PC+ course? UTCS is currently surveying our SPSS/PC+ users to determine if we should develop such a course. If you have not received the survey and you would like to provide UTCS with your comments, please call Sandra Gardner at 978-5128 or send an e-mail message to sgardner@vm.utcs.utoronto.ca.

SYSTAT

SYSNET, the SYSTAT Network newsletter published by SYSTAT, Inc., is available at the Information Office. This issue describes how to use SYSTAT version 5.1 under Macintosh System 7, and contains an article on major axis and reduced major axis regression.

UTCS Services

Facilities Managed by UTCS

Administrative Computing
- administrative ORACLE, IMS, DB2, TS0, Batch
- 3081K processor, 48 megabytes of memory
- MVS/XA operating system

Computer Disciplines Facility/PC
- 88 NEC computers connected in a Local Area Network:
  - •Robarts Library (Rm. 1061A): 36 NEC PCs
  - •St. Michael's College (Rm. 107): 26 NEC PCs
  - •Sidney Smith (Rm. 1071): 23 NEC PCs
  - •Trinity College (Rm. 024): 3 NEC PCs
- MS-DOS with Turing environment
- introductory computer science

Computers in Quantitative and Empirical Science Teaching (CQUEST)
- 52 DEC VT1000 X Window terminals, 20 DEC 2100 workstations connected in Local Area Network:
  - •Ramsay Wright (Rm. 211, 213): 29 DEC VT1000s, 10 DEC 2100s
  - •Sidney Smith (Rm. 2105): 20 DEC VT1000s, 10 DEC 2100s
  - •Departmental use: 3 DEC VT1000s

Public Sites
- 50 XT100 terminals connected to PACX
  - •Robarts Library (Rm. 1061A): 24 terminals
  - •Engineering Annex (Rm. 107B): 12 terminals
  - •St. Michael's College (Rm. 107): 9 terminals
  - •Victoria College (1st floor): 3 terminals
  - •Trinity College (Rm. 024): 2 terminals

Erindale College Systems
SUN 3/280, 16 megabytes of memory
- instructional and research access using UNIX

VAX 8200, 8 megabytes of memory
- instructional access using VMS
- research access

Institutional Relations System
VAX-11/750, 8 megabytes of memory
- database services to the owner departments using VMS

Ontario Centre for Large Scale Computation (OCLSC)
- Cray Research Inc. X-MP/28
- 2 processors, 8 megawords main memory
- solid state disk (SSD) with 64 megawords of storage
- UNICOS 5.1.11 operating system
- VAX 8350, MicroVAX-II, VAXstation 3200, and SUN-3/280 provide front-end services

> *The mission of Computing and Communications (UTCC) is to provide services, facilities, and expertise that ensures that the University of Toronto is a leader in the cost-effective utilization, management and evolution of information technology in support of the research, teaching, library, and administrative goals of the University.*

UTCS Centrally Owned and Managed

Systems

IBM VM/CMS
Technical Assistance: 978-6602
- General Purpose Timesharing environment
- Hub of the NetNorth network with access to BITNET, EARN and the Internet
- 4381-R03 processor with 32 megabytes of memory
- CP operating system, VM/SP HPO R6
- CMS timesharing system, VM/SP Release 6
- FTP and TELNET access to the campus Ethernet, as well as Internet
- RSCS spooling system, Release 2.3

GP UNIX
Technical Assistance: 978-8853
- General Purpose Timesharing under SUN UNIX 4.1.1
- SUN 4/490, 32 megabytes of memory
- access to Linotronic typesetter
- full access to USENET, an electronic technical information exchange facility
- full access to the Internet, UUCPNET, BITNET, CDNNET

Services

Facility Management Support
Primary Phone: 978-5050
- Installs, maintains and upgrades microcomputer systems, particularly Macintoshes, IBM PCs and compatibles on a contract basis or on a cost-per-call basis.

Network Development & Support
Primary Phone: 978-7087
- Communications Group provides communications systems, terminals, modems, data channels: consulting and installation.
- provides access between the IBM systems and machines using UNIX, VMS, and other operating systems. Ethernet, Pronet, and IBM TRN technologies are used over various transmission media including optical fibre. More basic communications techniques are also used for moderate speed links.
- provides consulting on local area networking
- provides access to NetNorth (BITNET), the North American Universities Network; ONET, the Ontario Regional Network; CA*net, the Canadian National Network; and USENET, the UNIX networking fraternity
- will provide a communications solution to department needs on a contractual basis

User Support Services
Advising and Consulting
Primary Phone: 978-HELP
- The Advising and Consulting group is available to University faculty, staff, and graduate students.
- provides phone-in advising, and consultations by appointment for the following products:
  - operating systems: DOS, Macintosh System & Finder
  - packages and libraries: SAS, SPSS, SYSTAT
  - word processors: WordPerfect, Microsoft Word
  - databases: dBASE IV, FoxBASE
  - spreadsheet: Lotus 1-2-3, Microsoft Excel
  - file transfer: ProComm, MacKermit
  - electronic mail: QuickMail

Information Technology Support
Primary Phone: 978-5601
- selection consulting for hardware and software
- Micro Lab for evaluation of hardware and software
- CD-ROM access to software and information discs
- offers phototypesetting service

Administration and Information Services
Primary Phone: 978-4462
- administers Local Area Network of PCs for Education Facility
- administers Macintosh Education Facility
- administers site licences for various software packages
- provides short courses and seminars on the more popular services and software packages
- provides accounting services for all UTCS services
- provides accounting services for the University's telephone system on behalf of the Voice Communications Department
- produces *ComputerNews* and the UTCC newsletter

Telephone Listings

Consulting and Enquiries

Account & Access Code Enquiries	Jason Pante	BC101B	978-7148
Communication, Networking & Hardware	Rosi Derka-Tseu	BC105	978-7087
Erindale College	Joe Lim	ER2035	828-5311
IBM & Macintosh Maintenance	Rosi Derka-Tseu	BC103	978-1299
Information Office	Evelyn Ward	BC201	978-4990
Tape Library (Academic Services)	Susan Kovago	MP368	978-7319
Tape Library (Administrative Services)	Miranda Fong	MP368	978-6693
UTCS Noncredit Short Courses	Irene Rosiecki	BC217	978-4565

Consulting & Advising Services: 978-HELP
CMS, and GP UNIX userids: .... ADVISOR
CMS Userid for mail problems: .... POSTMSTR
Network Operations Centre 978-4621
System Status Enquiries (GP UNIX) 978-4318
System Status Enquiries (IBM) 978-7393
Interactive Services 300 (bps) 978-3959
Interactive Services 1200 (bps) 978-3959
Interactive Services 2400 (bps) 978-7239
Interactive Services 9600 (bps) 978-7220

UTCS Directory

Management Office General Enquiry				978-4462
Director:	Dr. Warren Jackson	BC118	978-8948	wcj@vm.utcs.utoronto.ca
Associate Director, Operations:	Eugene Siciunas	BC116	978-5058	eugene@vm.utcs.utoronto.ca
Managers:				
Computer & Network Operations Support	Dr. Bob Chambers	MP350	978-7092	
Systems Support	Bill Lauriston	MP350	978-3579	bill@vm.utcs.utoronto.ca
Facility Management Support	Vera Cabanus	BC312A	978-7107	vcabanus@gpu.utcs.utoronto.ca
User Support Services	Don Gibson	BC312	978-7331	gibson@utcs.utoronto.ca
Network Development & Support	Norman Housley	BC121B	978-4967	norman@vm.utcs.utoronto.ca
Administration & Information Services	Ron Vander Kraats	BC121A	978-4428	rvk@vm.utcs.utoronto.ca

Legend:
BC = Bancroft Building
ER = Erindale
MP = McLennan Physical Labs

* NetNorth/BITNET/EARN

Terminal & Advising Sites

Names and Locations

Central Advising Office (CAO), 978-HELP
Engineering Annex (EA), 11 King's College Road, Room 107B
Erindale College (Erin), 828-5339, 3359 Mississauga Road North, Erindale Campus, Rooms 2037, 2045
Ramsay Wright, 25 Harbord St., Rooms 211, 213
Robarts, Robarts Library, 130 St. George St., Room 1061A
Sidney Smith (Sidney), 100 St. George St., Room 1071, 2105
St.Michael's College, 121 St. Joseph St., Room 107
Trinity College, 6 Hoskin Ave., Room 024
Victoria University, 73 Queen's Park Cres., 1st floor

Access Hours

Sites	Hours of Access				Restrictions*	Advising
	Mon-Thurs	Fri	Sat	Sun		
CAO	12:00-18:00	12:00-18:00	closed	closed	Research	978-HELP
EA	24 hrs	24 hrs	24 hrs	24 hrs	None	978-HELP for Research
Erin (2045)	9:00-22:00	9:00-22:00	12:00-18:00	12:00-18:00	none	Rm 2005
Ramsay Wright	7:00-21:00	7:00-18:00	closed	closed	Undergrads	No
Robarts	8:30-24:00	8:30-24:00	9:00-22:00	13:00-22:00	None	978-HELP for Research
Sidney	7:00-24:00	7:00-24:00	7:00-24:00	7:00-24:00	None	978-HELP for Research
St.Michael's	24 hrs	24 hrs	24 hrs	24 hrs	None	978-HELP for Research
Trinity	8:00-22:00	8:00-22:00	8:00-22:00	8:00-22:00	None	978-HELP for Research
Victoria	8:30-21:00	8:30-21:00	8:00-13:00	8:00-13:00	None	978-HELP for Research

Sites	Advising Hours
CAO	Monday through Friday, 12:00 - 18:00
Erin	Monday through Friday, 09:00 - 22:00

* Research includes graduates, faculty, staff

Computer and Printer Access

Sites	PACX	CDF/PC	CQUEST	Printers
EA	Y			Y*
Erin	Y			Y*
Ramsay Wright			Y	Y**
Robarts	Y	Y		Y*
Sidney		Y	Y	Y**
St.Michael's	Y	Y		Y*
Trinity	Y	Y		
Victoria	Y			

(Y=yes, N=no)
*** Public Printers** ****Site Only**

UTCS administers a number of software site licences available to the University of Toronto community. (Usually, this means faculty, staff, and graduate students, though some licences apply to undergraduate students also. See "Restrictions" in the table below.) The licences provide a variety of software at much-reduced cost. The majority of the licences must be renewed each year. Most are terminated when you leave U of T.

Each licence has a contract that you must complete. It outlines your responsibilities and any limitations in the use of the software. All contracts and software are available from the UTCS Information Office, 4 Bancroft Avenue, Room 201. To qualify as a member of the U of T community, you must provide a valid Employee number or Student number.

The table below describes the available site licences. The Restrictions column specifies who may purchase the license. If the restriction is Research, the payment must come from research money. The Diskettes/Distribution column describes how you actually receive the software. Large packages, like SAS and SPSS, require that you borrow the diskettes, install the software, and return the diskettes. Smaller packages, consisting of up to five diskettes, require you to bring your own diskettes.

For more detailed information about these site licences, telephone the UTCS Information Office at 978-4990.

Site Licences at UTCS

Product/ Operating System	Cost	Restrictions	Licence Period	Diskettes/ Distribution	*
Chaos in the Classroom I: Maps and Bifurcations					
PC	$12.00	Faculty, Staff, Graduate Students	One-time fee	One 5.25" or one 3.5"; bring own	Yes
CSLG					
There are over 250 individual software products included in this package.	$250.00	Departments with digital hardware	One-time fee	Call 978-4595.	No
IMSL					
UNIX Class IVA machines; FORTRAN Subroutines IMSL (MATH, STAT, SFUN): Exponent Graphics: C BASE Library: Interactive Document Facility: Environmental Install. & Assurance Tests: Registration Fee:	 $935.00 $475.00 $445.00 $140.00 $140.00 $588.00	U of T-owned machines	One-time fee	Tape cartridge or network download	Yes

***Documentation available at UTCS**

Site Licences at UTCS *cont.*

Product/ Operating System	Cost	Restrictions	Licence Period	Diskettes/ Distribution	*
IMSL					
UNIX Class IVB machines; FORTRAN Subroutines		U of T-owned machines	One-time fee	Tape cartridge or network download	Yes
IMSL (MATH, STAT, SFUN):	$565.00				
Exponent Graphics:	$285.00				
C BASE Library:	$265.00				
Interactive Document Facility:	$87.00				
Environmental Install. & Assurance Tests:	$87.00				
Registration Fee:	$588.00				
IMSL					
PC; FORTRAN Subroutines		U of T-owned machines	One-time fee	Deposit $100; borrow and return diskettes	Yes
IMSL (MATH, STAT, SFUN):	$195.00				
Maple (single machine or network server)					
DecStation 2100, 3100 (Ultrix)	$300.00	Staff	One-time fee	Borrow and return diskettes, tape cartridge; network download	Yes
DecStation 5000, 5100 (Ultrix)	$500.00				
DecStation 5400, 5800 (Ultrix)	$760.00				
HP 9000/300, HP 9000, 400 (HP-UX 7.0)	$300.00				
HP 9000/700, HP 9000, 800 (HP-UX 7.0)	$430.00				
SUN 3 (SUN OS 4.0)	$240.00				
SUN 4, SPARCstation (SUN OS 4.0)	$300.00				
SGI Personal IRIS (Irix)	$300.00				
SGI Professional IRIS 50-80GT (Irix)	$500.00				
SGI Professional IRIS 120-240GT (Irix)	$760.00				
PC-386 (DOS; UNIX)	$200.00				
MIPS, RC3230 (UNIX)	$300.00				
IBM RS6000 model 320 (AIX)	$300.00				
Macintosh (Finder)	$130.00				
Note: station cost is half the single machine price.					

***Documentation available at UTCS**

Site Licences at UTCS *cont.*

Product/ Operating System	Cost	Restrictions	Licence Period	Diskettes/ Distribution	*
Novell Netware 3.11					
PC; LAN Server License: Upgrade License: Mac Netware 3.0:	 $4690.00 $1340.00 $400.00	University Departments	One-time fee	Deposit $50; borrow and return diskettes	Yes
ProComm					
PC; Communications Note: Documentation on disk; part of package	Free	Faculty, Staff, Graduate Students, Undergraduate	N/A	Two 5.25"; bring own	Yes
QuickMail					
Mac; Electronic mail Per user: Upgrades:	 $35.00 $17.00	Faculty, Staff	One-time fee	One 3.5"; bring own	No
SAS/PC					
PC; Statistical analysisBASE/STAT/GRAPH/FSP: IML module: ETS module:	$35.00 $22.00 $35.00	Faculty, Staff, Graduate Students, Undergraduate	July 1-June 30	Deposit per binder (Maximum $350); borrow and return diskettes	Yes
SAS/PC network					
PC; Statistical analysis Per station:	 $17 .00	Faculty, Staff, Graduate Students	July 1-June 30	Deposit per binder (Maximum $350); borrow and return diskettes	Yes

***Documentation available at UTCS**

Site Licences at UTCS *cont.*

Product/ Operating System	Cost	Restrictions	Licence Period	Diskettes/ Distribution	*
SAS/UNIX (Sun 3)					
UNIX; Statistical analysis		Faculty, Staff, Graduate Students	July 1- June 30	Tape cartridge	Yes
BASE/STAT/GRAPH:	$198.00				
FSP, IML modules:	ea. $70.00				
SAS/UNIX (Sun 4)					
UNIX; Statistical analysis		Faculty, Staff, Graduate Students	July 1- June 30	Tape cartridge	Yes
BASE/STAT/GRAPH:	$264.00				
FSP, module:	ea. $92.00				
SPSS/PC					
PC; Statistical analysis	$40.00	Research	Nov 1- Oct 31	Deposit max. $50; borrow and return diskettes	No
SYSTAT					
Mac; Statistical analysis	$58.00	Faculty, Staff, Graduate Students	July 1- June 30	Six 800KB 3.5" diskettes; bring own	Yes
WATFOR-77					
PC; FORTRAN compiler		Research	July 1- June 30	Two-three 5.25" diskettes; bring own	Yes
[$35 WATFOR-87 (math co-processor)]	$35 .00				
GKS (Graphics Kernal System)	Add $5.00				
WordPerfect					
PC; WordProcessing		Faculty, Staff	One- time fee	Deposit $25; borrow and return diskettes	Yes
New:	$42.00				
Upgrade:	$15.00				

***Documentation available at UTCS**

PC Maintenance

Below is a listing of microcomputer equipment which UTCS Field Service covers under yearly maintenance contracts. All contracts are based on a minimum 12 month period. Service calls are handled on a first-come, first-served basis. Average response time is four hours. Equipment must be certified as operational prior to commencement of a maintenance contract. (There is no extra charge for this service.) Please contact UTCS Field Service at 978-5050 or 978-6486 to obtain service and pricing information.

IBM PC or Compatible Equipment

Systems
IBM PC or Compatible
IBM PC/XT or Compatible
IBM PC/AT or Compatible
IBM PS/2 - Model 25
IBM PS/2 - Model 30
IBM PS/2 - Model 50

Disk Drives
360KB & 1.2MB 5.25-inch Floppy
720KB & 1.4MB 3.5-inch Floppy

Hard Disk Drives
20,30,40,60 & 80 Megabyte

Displays
Monochrome
CGA / EGA / VGA Colour
PS/2 Monochrome
PS/2 Colour Display

Modems
1200 & 2400 baud

Laser Printers
HP LaserJet
HP LaserJet II
PS Jet +
QMS PS 800
QMS PS 800+
QMS 810

Dot Matrix Printers
C-ITOH F10-40 & F10-55
Epson RX80, FX80 & FX100
Epson LQ800, LQ1000, LQ1500
IBM Proprinter & Proprinter XL
NEC 3550, P5 & P6
Panasonic KX-P1091 & KX-P1092
Roland PR-1012
Toshiba P340, P341, P350 & P1351

Apple Macintosh Equipment

Systems
Mac 128, 512, Plus
Mac Classic - All Models
Mac LC - All Models
Mac SE - All Models
Mac SE/30 - All Models
Mac II, IIx, IIcx, IIci, IIsi, IIfx

Disk Drives
400KB, 800KB 3.5-inch Floppy
1.4MB 3.5-inch Floppy

Hard Disk Drives
20,30,40,60 & 80 Megabyte

Displays
Apple Mac 12-inch Monochrome
Apple Mac 12-inch RGB
Apple High-Res 12-inch Monochrome
Apple High-Res 13-inch Colour

Modems
1200 & 2400 baud

Laser Printers
Personal LaserWriter LS
Personal LaserWriter NT
LaserWriter
LaserWriter Plus
LaserWriter IINT
LaserWriter IINTX

Dot Matrix Printers
ImageWriter I
ImageWriter II
ImageWriter II/L
Apple StyleWriter

Support for UNIX

We support timesharing on GP UNIX under Sun OS 4.1.1.

Support for VM/CMS

We support CMS release 6.0 under CP/HPO releave 6.0 For CMS support, call Supervisor Ted Sikorski at 978-6602.

Support by UTCS Advising

The following are microcomputer software packages supported by the UTCS Advising and Consulting Group. This service is available to University of Toronto faculty, staff, and graduate students. For assistance with the products listed below, call 978-HELP, Monday through Friday, between 12:00 noon and 6:00 p.m.

Package/Compiler	**Version**	**Environment**
Communications		
File Transfer & Terminal Emulators		
MacKermit	0.9(40)	Macintosh
ProComm	TU 2.4.2	MS-DOS
Database Managers		
dBASE IV	1.1	MS-DOS
FoxBASE Mac	2.01	Macintosh
Electronic Mail		
QuickMail	2.2.3	Macintosh
Operating Systems		
IBM PC & Compatibles		
IBM PC-DOS	4.0	n/a
Microsoft MS-DOS (incl. IBM PC-DOS)	3.3	n/a
Macintosh		
Finder	6.0.X	n/a
MultiFinder	6.0.X	n/a
System	6.0.X	n/a
Spreadsheet & Charting		
Lotus 1-2-3	2.02	MS-DOS
Microsoft Excel	2.2a, 3.0	Macintosh
Statistical		
SAS/PC	6.04	MS-DOS
SPSS/PC+	4.0	MS-DOS
SYSTAT	3.2, 5.1	Macintosh
SAS	5.18, 6.07*	VM/CMS
SPSS^x	3.1, 4.1	VM/CMS
SAS	6.03, 6.07	UNIX, Sun3, Sun4
Word Processing		
Microsoft Word	4.0	Macintosh
WordPerfect	5.1	MS-DOS

*early 1992

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